WHAT IS CLAIMED IS:

1. A telemetry system for use in a wellbore, the telemetry system comprising:

multiple nodes positioned in the wellbore and distributed over a substantial length of the wellbore; and

the multiple nodes simultaneously communicating with a remote location via a single transmission channel at a combined data transmission rate of greater than 300 kbps.

2. The telemetry system according to Claim 1, wherein a usable bandwidth for transmitting from the remote location to the nodes is less than a usable bandwidth for transmitting from the nodes to the remote location.

3. The telemetry system according to Claim 1, wherein each of the nodes includes a modem for communication with a modem at the remote location.

4. The telemetry system according to Claim 3, wherein each of the node modems and the remote location modem include a transmitter and a receiver.

5. The telemetry system according to Claim 1, wherein each of the nodes includes at least one sensor.

6. The telemetry system according to Claim 5, wherein the sensor is a geophone.

7. The telemetry system according to Claim 1, wherein transmissions from the nodes arrive synchronously at the remote location.

8. The telemetry system according to Claim 1, wherein each of the nodes includes a transmitter which transmits data to the remote location using a set of frequency subchannels, each node transmitter using a unique set of subchannels.

9. The telemetry system according to Claim 8, wherein each node transmitter includes a data framer which inserts data in a superframe only in portions of the superframe corresponding to the set of subchannels used by the respective node transmitter.

10. The telemetry system according to Claim 8, wherein each node transmitter includes a cyclic redundancy check generator which attaches a byte only to a portion of the superframe corresponding to the set of subchannels used by the respective node transmitter.

11. The telemetry system according to Claim 8, wherein each node transmitter includes a data scrambler which scrambles data only in a portion of the superframe corresponding to the set of subchannels used by the respective node transmitter.

12. The telemetry system according to Claim 8, wherein each node transmitter includes an encoder which adds forward error correction bits only to a portion of the superframe corresponding to the set of subchannels used by the respective node transmitter.

13. The telemetry system according to Claim 8, wherein each node transmitter includes a data interleaver which interleaves data only in a portion of the superframe corresponding to the set of subchannels used by the respective node transmitter.

14. The telemetry system according to Claim 8, wherein each node transmitter includes a QAM constellation encoder which encodes data only in a portion of the superframe corresponding to the set of subchannels used by the respective node transmitter.

15. The telemetry system according to Claim 8, wherein each node transmitter includes a cyclic prefix adder, but only one of the cyclic prefix adders adds a cyclic prefix to the superframe generated by the respective transmitter.

16. The telemetry system according to Claim 1, further comprising a receiver at the remote location receiving data transmitted from each node in a respective superframe.

17. The telemetry system according to Claim 16, wherein the receiver includes a de-interleaver which separately de-interleaves data transmitted from each of the nodes in a portion of the corresponding superframe associated with the respective node.

18. The telemetry system according to Claim 16, wherein the receiver includes a decoder which separately detects and corrects bit errors identified by forward error correction bits from each of the nodes in a portion of the corresponding superframe associated with the respective node.

19. The telemetry system according to Claim 16, wherein the receiver includes a descrambler which separately descrambles data from each of the nodes in a portion of the corresponding superframe associated with the respective node.

20. The telemetry system according to Claim 16, wherein the receiver includes a cyclic redundancy checker which separately checks data from each of the nodes in a portion of the corresponding superframe associated with the respective node.

21. The telemetry system according to Claim 1, further comprising a transmitter at the remote location for transmitting to the nodes, the transmitter adding an address to a transmission which is directed to any single node, each node having a unique address.

22. The telemetry system according to Claim 21, wherein each node includes a receiver which responds to the unique address of the respective node.

23. A method of communicating data in a wellbore, the method comprising the steps of:

installing multiple downhole modems in the wellbore;

installing a remote modem at a location remote from the downhole modems; and

simultaneously communicating data from each of the downhole modems to the remote modem, each downhole modem communicating with the remote modem using at least one frequency subchannel separate from frequency subchannels used by the other downhole modems.

24. The method according to Claim 23, further comprising the step of determining a bit rate capacity of each of the subchannels.

25. The method according to Claim 24, wherein in the bit rate capacity determining step, some of the subchannels have less bit rate capacity than others of the subchannels.

26. The method according to Claim 24, further comprising the step of assigning the subchannels to the respective downhole modems.

27. The method according to Claim 26, wherein the subchannels assigning step includes assigning the subchannels to the respective downhole modems so that the subchannels assigned to each downhole modem have a combined bit rate capacity which is greater than or equal to a bit rate requirement for the respective downhole modem.

28. The method according to Claim 26, wherein the subchannels assigning step is performed after the downhole modems are installed in the wellbore.

29. The method according to Claim 23, wherein the data communicating step further comprises transmitting data from the downhole modems to the remote modem, the data arriving synchronously at the remote modem.

30. The method according to Claim 29, wherein the data transmitting step further comprises calculating a transmission delay between the remote modem and each of the downhole modems and delaying a clock circuit of each downhole modem based on the calculated transmission delay for the respective downhole modem.

31. The method according to Claim 30, further comprising the step of phase locking each of the downhole modem clock circuits to a tone broadcast from the remote modem to each of the downhole modems.

32. The method according to Claim 23, wherein the data communicating step further comprises transmitting a data superframe from each of the downhole modems to the remote modem.

33. The method according to Claim 32, wherein in the superframes transmitting step, a data framer of each of the downhole modems inserts data only in a portion of the superframe corresponding to the at least one subchannel used by the respective downhole modem.

34. The method according to Claim 32, wherein the superframes transmitting step further comprises attaching a cyclic redundancy check generator byte in each of the downhole modems only to a portion of the

corresponding superframe which contains data associated with the respective downhole modem.

35. The method according to Claim 32, wherein the superframes transmitting step further comprises scrambling in each of the downhole modems data only in a portion of the superframe corresponding to the at least one subchannel used by the respective downhole modem.

36. The method according to Claim 32, wherein the superframes transmitting step further comprises adding forward error correction bits in each of the downhole modems only to a portion of the corresponding superframe which contains data associated with the respective downhole modem.

37. The method according to Claim 32, wherein the superframes transmitting step further comprises interleaving data in each of the downhole modems only in a portion of the corresponding superframe which contains data associated with the respective downhole modem.

38. The method according to Claim 32, wherein the superframes transmitting step further comprises QAM constellation encoding data in each of the downhole modems only in a portion of the corresponding superframe which contains data associated with the respective downhole modem.

39. The method according to Claim 32, wherein the superframes transmitting step further comprises adding a cyclic prefix in only one of the downhole modems to the corresponding superframe.

40. The method according to Claim 23, wherein the data communicating step further comprises receiving data superframes from the downhole modems at the remote modem.

41. The method according to Claim 40, wherein the receiving step further comprises summing the data superframes transmitted from the downhole modems.

42. The method according to Claim 40, wherein the receiving step further comprises separately de-interleaving for each downhole modem the at least one subchannel used by the respective downhole modem.

43. The method according to Claim 40, wherein the receiving step further comprises separately detecting and correcting bit errors in the at least one subchannel used by each respective downhole modem.

44. The method according to Claim 40, wherein the receiving step further comprises separately descrambling the at least one subchannel used by each respective downhole modem.

45. The method according to Claim 40, wherein the receiving step further comprises using a cyclic redundancy checker to separately check data in the at least one subchannel used by each respective downhole modem.

46. The method according to Claim 23, further comprising the step of establishing a unique address for each of the downhole modems.

47. The method according to Claim 46, wherein the establishing step is performed after installing the downhole modems in the wellbore.

48. The method according to Claim 23, further comprising the steps of broadcasting wideband signals between the remote and downhole modems, calculating upstream and downstream received power spectral density for each modem, adjusting an automatic gain control for each modem, and training at least one equalizer of each modem.

49. The method according to Claim 23, further comprising the step of exchanging channel capability and configuration information between the remote modem and each of the downhole modems.

50. The method according to Claim 23, further comprising the step of determining the at least one subchannel for each downhole modem.

51. The method according to Claim 50, wherein the determining step is performed by the remote modem.